

THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.

Paper No. 26

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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Ex parte MITSUBISHI MATERIALS CORPORATION

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Appeal No. 98-2735  
Application No. 90004386<sup>1</sup>

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HEARD: March 10, 1999

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Before HANLON, PAK, and LIEBERMAN, Administrative Patent Judges.

PAK, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on an appeal under 35 U.S.C. § 134 and 306 from the examiner's final rejection of claims 1 through 14, which are all of the claims pending in the present

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<sup>1</sup> Reexamination filed September 26, 1996. This is a reexamination of Application 08/143,118, filed October 29, 1993, now U.S. Patent No. 5,398,915, issued March 21, 1995.

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application (Reexamination Control No. 90/004,386) involving reexamination of U.S. Patent 5,398,915 issued March 21, 1995. This appeal is related to Appeal No. 99-0254, an appeal from a final rejection of the claims pending in an application (Reexamination Control No. 90/004,385) involving reexamination of U.S. Patent 5,320,662 issued June 14, 1994, which is directed to a process for continuous copper smelting.

CLAIMED SUBJECT MATTER

According to appellants, the claimed subject matter is directed to an "improvement in an apparatus for the continuous smelting of copper." See Brief, page 2, in conjunction with Brief, page 16. Claim 1 is illustrative of the claimed subject matter and reads as follows:

Claim 1. An apparatus for smelting copper comprising:

blister copper producing means;

a plurality of blister copper refining furnaces for refining blister copper into copper of higher quality;

and

blister copper launder means connecting said blister copper producing means and said blister copper refining furnaces.

PRIOR ART

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As evidence of obviousness, the examiner relies on the following prior art:

Vogt et al. (Vogt)	3,650,519	Mar. 21,
1972		
De Bic	3,715,203	Feb. 06,
1973		
Arentzen	4,178,174	Dec. 11,
1979		
Brimacombe et al. (Brimacombe)	4,238,228	Dec. 09,
1980		
Hoffmann et al. (Hoffmann)	4,421,552	Dec. 20,
1983		
Mackey et al. (Mackey (I))	4,504,309	Mar. 12,
1985		
Mackey et al. (Mackey (II))	1,190,751	Jul. 23,
1985		
(Published Canadian Patent)		
Bibby	16,273	Sep. 24,
1891		
(Published Great Britain Application)		
Tittes et al. (Tittes)	2,141,535 A	Dec. 19, 1984
(Published Great Britain Application)		
Ikoma <sup>2</sup>	61-52327	Mar. 15, 1986
(Published Japanese Application)		

A. K. Biswas et al. (Biswas), "Preparation of Anodes: Sulphur and Oxygen Removal," in Extractive Metallurgy of Copper, pp. 242-245 (New York, Pergamon Press, 1976).

T. J . A. Smith et al. (Smith), "Oxygen Smelting and the Olympic Dam Project," in G. Kachaniwsky et al. (Editor), Proceedings of the International Symposium on The Impact of Oxygen on the Productivity of Non-Ferrous Metallurgical Processes, pp. 49-59 (New York, Pergamon Press, 1987).

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<sup>2</sup> Our reference to Ikoma is to its corresponding English translation of record.

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As evidence of unobviousness, appellants rely on the following prior art:

Dale W. Rodolff et al., "Review of Flash Smelting and Flash Converting Technology," in TMS Technical Paper, Paper No. A86-64, pp. 1-31 (1986)(hereinafter referred to as "Exhibit F").

Carlos Diaz et al., "Outokumpu Flash Smelting in Copper Metallurgy-The Latest Developments and Applications" in Anjala et al. (Editor), 4, Pyrometallurgy of Copper, pp. 19-35, New York, unknown publication date, (hereinafter referred to as "Exhibit H").

G. Kachaniwsky et al., "The Impact of Oxygen on the Productivity of Non-Ferrous Metallurgical Processes" in, Anjala et al. (Editor), The Role of Oxygen in the Outokumpu Flash Smelting Process, pp. 87-105 (New York, Pergamon Press 1987)(hereinafter referred to as "Exhibit G").

Irashad A. Rana et al., "Converting Alternatives for Copper Smelting Processes," pp. 91-105, unknown publication date, (hereinafter referred to as "Exhibit E").

#### REJECTIONS

The appealed claims stand rejected as follows:

- (1) Claims 1 through 3, 9, 10, 12 and 14 under 35 U.S.C. § 103 as unpatentable over either Smith or Hoffmann in view of Bibby;
- (2) Claim 4 under 35 U.S.C. § 103 as unpatentable over either Smith or Hoffmann, and Bibby further in view of any one of Biswas, Tittes and Vogt;

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(3) Claim 5 under 35 U.S.C. § 103 as unpatentable over either Smith or Hoffmann, Bibby, and any one of Biswas, Tittes and Vogt further in view of any one of Mackey (II), Tittes, Brimacombe, and Mackey (I);

(4) Claims 7 and 8 under 35 U.S.C. § 103 as unpatentable over either Smith or Hoffmann in view of Bibby or either Smith or Hoffmann, and Bibby further in view of De Bic; and

(5) Claims 11 through 13 under 35 U.S.C. § 103 as unpatentable over either Smith or Hoffmann, and Bibby further in view of Ikoma.

#### OPINION

We have carefully reviewed the claims, specification and applied prior art, including all of the arguments advanced by the examiner and appellants in support of their respective positions. This review leads us to conclude that the examiner's rejection is not well founded. Our reasons for this determination follow:

Under 35 U.S.C. § 103, the obviousness of a claimed subject matter cannot be established by combining the teachings of cited prior art absent some teaching, suggestion or incentive supporting the combination. **See ACS Hospital**

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**Systems, Inc. v. Montefiore Hospital**, 732 F.2d 1572, 1577, 221 USPQ 929, 933 (Fed. Cir. 1984). This does not mean that the cited prior art must specifically suggest making the combination. **See B.F. Goodrich Co. V. Aircraft Braking Systems Corp.**, 72 F.3d 1577, 1582, 37 USPQ2d 1314, 1318 (Fed. Cir. 1996); **In re Nilssen**, 851 F.2d 1401, 1403, 7 USPQ2d 1500, 1502 (Fed. Cir. 1988). Rather, the test for obviousness is what the combined teachings of the prior art would have suggested to those of ordinary skill in the art. **In re Young**, 927 F.2d 588, 591, 18 USPQ2d 1089, 1091 (Fed. Cir. 1991); **In re Keller**, 642 F.2d 413, 425, 208 USPQ 871, 881 (CCPA 1981). "As long as some motivation or suggestion to combine the references is provided by the prior art taken as a whole, the law does not require that the [prior art] references be combined for the reasons contemplated by the inventor." **In re Beattie**, 974 F.2d 1309, 1312, 24 USPQ2d 1040, 1042 (Fed. Cir. 1992). Nor does the prior art references need to disclose explicitly all the utilities or benefits of the claimed invention to render the claimed subject matter unpatentable under Section 103. **See In re Dillon**, 919 F.2d 688, 692, 696,

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16 USPQ2d 1897, 1901, 1904 (Fed. Cir. 1990) (in banc), **cert. denied**, 500 U.S. 904 (1991).

In determining the existence of some suggestion or motivation, it is proper to take into account not only the specific teachings of the prior art but also the inferences which one skilled in the art would reasonably be expected to draw therefrom. **See In re Preda**, 401 F.2d 825, 826, 159 USPQ 342, 344 (CCPA 1968). Skill must be presumed on the part of those skilled in the art. **See In re Sovish**, 769 F.2d 738, 226 USPQ 771 (Fed. Cir. 1985); **See also In re Jacoby**, 309 F.2d 513, 135 USPQ 317 (CCPA 1962) (artisans must be presumed to know something about the art apart from what the prior art discloses); **In re Bozek**, 416 F.2d 1385, 163 USPQ 545 (CCPA 1969) (the conclusion of obviousness may be made from "common knowledge and common sense" of the person of ordinary skill in the art).

The initial inquiry into determining the propriety of the examiner's obviousness analysis is to correctly construe the scope and meaning of the claimed subject matter. **Gechter v. Davidson**, 116 F.3d 1454, 1457, 43 USPQ2d 1030, 1032 (Fed. Cir.

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1997); ***In re Paulsen***, 30 F.3d 1475, 1479, 31 USPQ2d 1671, 1674 (Fed. Cir. 1994). Generally, we give the broadest reasonable interpretation to the terms in the claims consistent with appellants' specification. ***In re Morris***, 127 F.3d 1048, 1054-1055, 44 USPQ2d 1023 1027 (Fed. Cir. 1997). When the terms in the claims are written in a "means-plus-function" format, however, we interpret them as the corresponding structure described in the specification or equivalents thereof consistent with 35 U.S.C. § 112, paragraph 6. ***In re Donaldson***, 16 F.3d 1189, 1193, 29 USPQ2d 1845, 1848 (Fed. Cir. 1994)(in banc). The manner in which a "means-plus-function" element is expressed, either by a function followed by the term "means" or by the term "means for" followed by a function, is unimportant so long as the modifier of that term specifies a function to be performed. ***Ex part Klumb***, 159 USPQ 694, 695 (Bd. App. 1967). Nevertheless, the term "means" as used above is not treated as a means-plus-function element if the claimed "means" includes sufficient structural limitations. ***See Al-Site Corp. v. VSI International Inc.***, 174 F.3d 1308, 1319, 50 USPQ2d 1161, 1167 (Fed. Cir. 1999);



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***Unidynamics Corp. V. Automatic Products International Ltd.***,  
157 F.3d 1311, 1319, 48 USPQ2d 1099, 1104-1105 (Fed. Cir.  
1998).

Applying the above statutory interpretation to the present case, we determine that the terms "blister copper producing means" and "blister copper launder means" recited in claim 1 are means-plus-function elements. See also appellants' admission at, e.g., Brief, pages 16-19. Nowhere does claim 1 recite sufficient structural limitations for either "blister copper launder means" or "blister copper producing means", which can perform continuous copper smelting. ***See Unidynamic Corp.***, 157 F.3d at 1319, 48 USPQ2d at 1105. Thus, we look to the specification for the structure corresponding to "blister copper producing means" and "blister copper launder means" and equivalents thereof to determine the scope of claim 1, the broadest claim in this application.

We observe that the specification defines "blister copper producing means" as follows (column 3, line 52 to column 4, line 12):

As is the case with the prior art smelting apparatus, the continuous copper smelting apparatus

in accordance with the present embodiment includes a smelting furnace 1 for melting and oxidizing copper concentrates to produce a mixture of matte M and slag S, a separating furnace 2 for separating the matte M from the slag S, a converting furnace 3 for oxidizing the matte M separated from the slag S to produce blister copper . . . . The smelting furnace 1, the separating furnace 2 and the converting furnace 3 are arranged so as to have different elevations in the descending order, and melt launder means comprised of inclined launders 7A and 7B defining fluid passageways for the melt are provided so as to connect the above three furnaces in series. Thus, the melt is tapped from the smelting furnace 1 through the launder 7A to the separating furnace 2 and from the separating furnace 2 through the launder 7B down into the converting furnace 3. Furthermore, in each of the smelting furnace 1 and the converting furnace 3, a plurality of lances 5 each composed of a double-pipe structure are inserted through the furnace roof and secured thereto for vertical movement, and the copper concentrates, oxygen-enriched air, flux and so on are supplied into each furnace through these lances 5. Furthermore, the separating furnace 2 is composed of an electric furnace equipped with a plurality of electrodes 6.

Thus, we interpret "blister copper producing means" as "a smelting furnace having vertically moveable double-pipe structure lances, a separating furnace equipped with a plurality of electrodes and a converting furnace having a vertically moveable double-pipe structure lances, with each furnace arranged in different elevations in descending order

with launders defining fluid passageways from one furnace to another, or equivalents thereof".

We also observe that the specification defines "blister copper launder means" as follows (Column 4, lines 17-68, column 5, lines 26-30 and column 6, lines 4-9):

The launder means 11, through which the blister copper produced in the converting furnace 3 is transferred to the anode furnaces 4, includes an upstream main launder 11A connected at its one end to the outlet of the converting furnace 3 and sloping downwardly in a direction away from the converting furnace 3, and a pair of downstream branch launders 11B and 11B branched off from the main launder 11A so as to be inclined downwardly in a direction away from the main launder 11A and connected at their ends to the anode furnaces 4 and 4, respectively.

main Furthermore, means 12 for selectively bringing the launder 11A into fluid communication with one of the branch launders 11B is provided at the junction between the main launder 11A and the branch launders 11B. This means 12 may be of any structure. In the simplest form, that portion of each branch launder 11B adjacent to the junction with the main launder 11A may be formed such that its-bottom is somewhat shallow, and a castable or a lump or refractory material may be cast into the shallow portion of the branch launder 11B which is not be utilized.

Instead of the means of the above structure, the change of the blister copper passageway may be carried out by a suitable selecting device attached to the blister copper launder means 11. FIGS. 13 and 14 depict an example of such a selecting assembly. In this illustrated example, the inclined main launder 11A has an open downstream end, and a

pair of branch launders 11B are Joined [sic, joined] to each other by a horizontal portion 11C, above which the downstream end of the main launder 11A is located. The selecting assembly comprises a pair of closing devices 40 disposed at the upstream ends of the branch launders 11B, respectively. Each of the closing device 40 includes a closing plate 41 made of the same material as the melt and disposed vertically so as to close the fluid passageway in the branch launder 11B, a lifting device (not shown) connected to the closing plate 41 at its upper end through a hook 42 and a rope, a supply tube 43a connected to the closing plate 41 for supplying a coolant into the closing plate 41, and a discharge tube 43b connected to the closing plate 41 for discharging the coolant from the closing plate 41. As best shown in FIG. 14, the closing plate 41, which is smiliar in configuration to the cross-section of the branch launder passageway, is formed slightly smaller than the cross-section of the branch launder 11B, and is provided with a fluid passageway 41a formed meanderingly therethrough and having opposite ends 41b and 41c opening to the top of the closing plate 41. The supply and discharge tubes 43a and 43b are sealably and. . . .

. . . , the above blister copper launders 11A and 11B are all provided with covers, heat conserving devices such as burners and/or facilities for regulating the ambient atmosphere are provided thereon, whereby the melt flowing down through these launders is kept at high 30 temperature in a hermetically sealed state.

. . . , each branch launder 11B for flowing the blister copper melt is inserted through the side plate of the hood 31 in such a manner that an end 11C of the launder 11B is located above the flue opening 30. The hood 31 as well as the end 11C of the launder 11B are provided with watercooling Jackets J, respectively.

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Thus, we interpret "blister copper launder means" as "branch launders (main launder attached to two other launders) having all the specified structure indicated above, including one of the two specifically-mentioned selective device structures at the junction of the main launder and the two other attached launders, or equivalents thereof"

Having interpreted that the "blister copper producing means" and "blister copper lander means" as indicated above, we compare the claimed subject matter with the prior art disclosures. We find that appellants do not dispute the examiner's finding that:

Both Smith, at page 57, under the heading of "Furnace Construction" for example, and the '552 Patent to Hoffmann et al, at col. 4, lines 46-61 and col. 5, lines 11-12, teach supplying blister copper from a blister copper producing furnace, by way of heated launders of unspecified structure, to one of a plurality of anode furnaces, where the blister copper is delivered continuously (see col. 4, lines 58-61 of the '552 Patent for example) to the anode furnaces.

Compare Answer, pages 2 and 3 with Brief and Reply Brief in their entirety. Appellants also appear to acknowledge that both Smith and Hoffmann describe

(1) the claimed "blister copper producing means";

(2) the claimed "blister copper refining furnaces"; and  
(3) "a pair of unbranched launders" for continuously supplying blister copper from the "blister copper producing means" to the "blister copper refining furnaces". See Brief, pages 16-19 and 22-27, including reference to Exhibits E, F, G and H. On the other hand, we find that Bibby shows using branched launders (gutter structure) to transport molten copper from an upstream copper refining or producing furnace to a plurality of downstream refining furnaces. See also Answer, page 4 and 12, and Brief, pages 26-27.

Based the above findings of fact, we agree with the examiner to the extent that it would have been ***prima facie*** obvious to employ the branched launder described in Bibby in the copper smelting apparatus of Smith or Hoffmann. Whether Bibby describes a batch or continuous copper smelting process is not critical. One of ordinary skill in the art would have had a reasonable expectation of successfully transporting molten copper from a blister copper producing means to a plurality of blister copper refining furnaces in the same manner as that described in Smith and Hoffmann through implementing one or two branched launders, in the place of one

or both unbranched launders, (depending on the desired number (increased number) of blister copper refining furnaces to be used) in the same manner the unbranched launders are employed in Smith or Hoffmann. By using or operating branched launders in the same manner as those unbranched launders described in Smith or Hoffmann, one of ordinary skill in the art would have had a reasonable expectation of successfully reducing the cost associated with the number of lengthy launders needed for a given plurality of blister copper furnaces and the number of holes needed in a blister copper producing furnace for a given number of launders employed, as well as reducing the potential leakage associated with the increased number of holes present in a blister copper producing furnace. ***See In re Thompson***, 545 F.2d 1290, 1294, 192 USPQ 275 (CCPA 1976); ***In re Clinton***, 527 F.2d 1226, 1228, 188 USPQ 365, 367 (CCPA 1976). We find that one of ordinary skill in the art has "common knowledge and common sense" to recognize the cost saving and potential problem avoidance associated with employing branched launders as indicated ***supra***.

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Nevertheless, the above combination suggested by the combined teachings of either Smith and Bibby or Hoffmann and Bibby does not result in the claimed subject matter. For instance, none of the Smith, Hoffmann and Bibby references, either alone or in combination, teaches, or would have suggested, the above-mentioned specific selecting assembly structure at the specific location, which is part of the claimed blister copper launder means of the claimed copper smelting apparatus. Nor do any of the remaining prior art references relied upon by the examiner remedy the above deficiencies. Accordingly, we reverse the examiner's decision rejecting claims 1 through 14 under 35 U.S.C. § 103.

As a final point, upon return of this application, the examiner is to determine whether U.S. Patent 5,205,859 issued to Goto et al and U.S. Patent 4,390,169 issued to LaBate, which are already placed in the application by appellants, affect the patentability of the claimed subject matter. With respect to LaBate, it should be considered together with the prior art already relied upon by the examiner.



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No time period for taking any subsequent action in  
connection with this appeal may be extended under 37 CFR  
§ 1.136(a).

REVERSED

ADRIENE LEPIANE HANLON	)	
Administrative Patent Judge	)	
	)	
	)	
	)	
	)	BOARD OF PATENT
CHUNG K. PAK	)	APPEALS
Administrative Patent Judge	)	AND
	)	INTERFERENCES
	)	
	)	
	)	
PAUL LIEBERMAN	)	
Administrative Patent Judge	)	

CKP:lp

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Application No. 90004386

APJ PAK

APJ HANLON

APJ LIEBERMAN

DECISION: REVERSED  
Send Reference(s): Yes No  
or Translation (s)  
Panel Change: Yes No  
Index Sheet-2901 Rejection(s): \_\_\_\_\_

Prepared: September 10, 1999

Draft      Final

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PALM / ACTS 2 / BOOK  
DISK (FOIA) / REPORT